

U. S. Department of Commerce

Maurice H. Stans

Secretary

National Bureau of Standards

A. V. Astin, Director



Certificate of Analysis

STANDARD REFERENCE MATERIAL 178

O.4C Basic Oxygen Furnace Steel

ANALYST	C	Mn	P	S	Si	Cu	Ni	Cr	V	Mo
	Combustion-Gravimetric	Persulfate-Arsenite	Photometric	Combustion-titration	Perchloric acid dehydration	Photometric	Photometric			Photometric
1	0.398	{0.822 0.825 ^a }	0.011 ^b	0.014 ^c	0.163 ^d	{0.031 0.034 ^e }	0.012	{0.018 ^f 0.015 ^g }	{0.001 ^f 0.001 ^g }	0.003
2	.398	.827	.012 ^h	.014	.162	.032 ⁱ	.010	.015 ^j	.001 ^k	.003
3	.394 ^l	.817 ^m	.011 ⁿ	.012	.163 ^d	.033 ^o	.009	.014 ^e	.001 ^p	.002
4	{.396 ^l .392}	.828	.013 ^h	.013	.160 ^d	{.030 .033 ^e }	{.011 .011 ^e }	{.015 ^q .020 ^s }	.002 ^r	.002
5	.394	.826	.011 ^h	.015	.167 ^d	.033 ^o	.010	.015 ^s	.001 ^t	.003
Average	0.395	0.824	0.012	0.014	0.163	0.032	0.010	0.016	0.001	0.003

^a Neutron activation analysis.

^b Molybdenum-blue photometric method. See J. Res. NBS 26, 405 (1941) RP1386.

^c 1-g sample burned in oxygen at 1450 °C and sulfur dioxide absorbed in starch-iodide solution. Iodine liberated from iodide by titration, during the combustion, with standard KIO₃ solution.

^d Double dehydration.

^e Atomic absorption method.

^f Chromium separated from the bulk of the iron in a 10-g sample by hydrolytic precipitation with NaHCO₃, oxidized with persulfate and titrated potentiometrically with ferrous ammonium sulfate solution.

^g Vanadium separated as in (f), oxidized with HNO₃ and titrated potentiometrically with ferrous ammonium sulfate solution.

^h Alkali-molybdate method.

ⁱ Cuprizone photometric method.

^j Oxidized chromium titrated amperometrically with ferrous ammonium sulfate solution.

^k Oxidized vanadium titrated amperometrically with ferrous ammonium sulfate solution.

^l Thermal conductivity method.

^m KIO₄ photometric method.

ⁿ Ammonium vanadate-phosphomolybdate photometric.

^o Neocuproine photometric method.

^p Flame emission spectroscopy.

^q Diphenylcarbazide photometric method.

^r Benzoyl phenylhydroxylamine photometric method.

^s Chromium oxidized with HClO₄-titration with FeSO₄-KMnO₄.

^t Vanadium precipitated with cupferron and determined by FeSO₄-(NH₄)₂S₂O₈-KMnO₄ method.

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J. Paul Cali, Acting Chief
Office of Standard Reference Materials

1. J. R. Baldwin, D. A. Becker, T. E. Gillis, B. A. Thompson, B. B. Bendigo, E. R. Deardorff, S. A. Wicks, T. C. Bains, and T. A. Rush, Chemistry Division, Institute for Materials Research, National Bureau of Standards.
2. F. P. Valentine and J. F. Yelapi, Department of the Army, Army Materials and Mechanics Research Center, Watertown, Massachusetts.
3. R. B. Frictioni, Allegheny Ludlum Steel Corp., Brackenridge, Pennsylvania.
4. R. W. Bley, Inland Steel Company, East Chicago, Indiana.
5. R. H. Rouse, Bethlehem Steel Corp., Sparrows Point Plant, Sparrows Point, Maryland.
- The material for the preparation of this standard was furnished by Armcro Steel Corp., Mid-
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- The overall direction and coordination of the technical measurements leading to certifica-
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- This technical and support aspects involved in the preparation, certification and issuance of
this Standard Reference Material were coordinated through the Office of Standard Reference
Materials by R. E. Michaelis.

List of Analysts